

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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**FEDERAL COMMUNICATIONS COMMISSION
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In the Matter of

Amendment of Parts 21 and 74 To Enable
Multipoint Distribution Service and
Instructional Fixed Television Fixed
Service Licensees To Engage In Fixed
Two-Way Transmissions

)
)
) MM Docket No. 97-217
)
) File No. RM-9060
)

**CONSOLIDATED OPPOSITION TO
PETITIONS FOR RECONSIDERATION**

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EXECUTIVE SUMMARY

Most of the petitions for reconsideration in this proceeding have advocated rule changes that will substantially promote the most rapid and efficient deployment of advanced technologies by MDS and ITFS licensees. However, the petitions filed by Instructional Telecommunications Foundation ("ITF"), Catholic Television Network ("CTN") and Spike Technologies, Inc. ("Spike") propose certain rule changes that, if adopted, would substantially retard the ability of MDS and ITFS licensees to utilize their spectrum for two-way broadband services.

Repeating arguments previously advanced and categorically rejected, ITF urges the Commission to retreat from using a licensing system for response station hubs and high-power boosters. Instead, ITF calls for a return to the site-specific rules that have prevented the rapid inauguration of service by MDS and ITFS licensees. ITF's proposed rules not only would require a substantial increase in the Commission's ITFS application processing personnel resources to implement, but would force the use of auctions to choose from among competing applications for response station hubs and high-power boosters. The only winners under ITF's proposal are those attempting to delay the inauguration of service by their neighbors and those with pockets deep enough to outbid financially-strapped local educators.

Many of the proposals advanced by CTN merely repeat proposals previously rejected by the Commission, without any substantive discussion by CTN of why the Commission was allegedly wrong. For example, ignoring the Commission's detailed analysis of the issue in the *R&O* and a record showing that guardbands between upstream and downstream channels are contrary to the best interests of the educational community, CTN summarily calls for the imposition of such guardbands. CTN's cursory proposals for the testing of response stations and for two-step licensing are similarly flawed.

The Commission should reject CTN's call for unqualified protection against downconverter overload of ITFS receive sites registered after an application for a response station hub has been filed. The record clearly reflects that once a response station hub application is filed, the ITFS licensee can and should protect itself from any possible interference through the use of appropriate downconverters and filtering. The Commission should also reject CTN's proposal that applicants be free to use the propagation model of their choosing in conducting interference analyses. The benefits of a using a common, Commission-mandated method of analysis are a matter of record.

The complaint resolution procedures proposed by CTN would place unprecedented power in the hands of licensees to force their neighbors to cease operations. Nonetheless, the Petitioners would not oppose the adoption of CTN's proposed procedures for addressing "documented complaints," subject to certain modifications, so long as that adoption is accompanied by elimination of onerous requirements imposed prior to the activation of response stations.

Spike urges the Commission to eliminate entirely the frequency tolerance requirement for non-VSB digital transmissions, relying on a fundamentally flawed reading of the Commission's prior decision to permit digital modulation on MDS and ITFS channels and on the record in this proceeding. Contrary to Spike's assertions, the Commission has recognized that there are benefits to maintaining a frequency tolerance requirement for non-VSB digital transmissions. However, the Petitioners do not disagree that the limitation can be loosened to permit the use of conventional crystal oscillators. Spike also urges the Commission to adopt revised formulas for calculating

compliance with the spectral mask. While Spike maintains that those revisions are needed to eliminate inconsistencies in the Commission's rules, there are no inconsistencies, and, in any event, Spike's formulas are substantially flawed.

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**CONSOLIDATED OPPOSITION TO
PETITIONS FOR RECONSIDERATION**

The over 110 parties to the Petition for Rulemaking that commenced this proceeding (collectively, the "Petitioners"), by their attorneys and pursuant to Section 1.429(f) of the Commission's Rules, hereby submit their consolidated opposition to the petitions filed by Instructional Telecommunications Foundation, Inc. ("ITF"), Catholic Television Network ("CTN") and Spike Technologies, Inc. ("Spike") seeking reconsideration of the initial *Report and Order* (the "*R&O*") in this proceeding.^{1/}

I. INTRODUCTION.

Of the eleven petitions for reconsideration of the *R&O*, the overwhelming majority propose revisions to the newly-adopted rules that will advance the Commission's interest in assuring that the spectrum allocated to the Multipoint Distribution Service ("MDS") and the Instructional Television Fixed Service ("ITFS") is used to "provide increased service to consumers, upgrade the tools available to educational institutions and enhance the competitive position of MDS operators."^{2/} Indeed, there is a substantial consensus that, with a relatively few changes to the rules adopted in the *R&O*, the Commission can make substantial improvements in the regulatory environment for MDS and ITFS.

^{1/} See *Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service And Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions*, FCC 98-231, MM Docket No. 97-217 (rel. Sept. 25, 1998) [hereinafter cited as "*R&O*"].

^{2/} *R&O*, at ¶ 2.

For example, there has been a groundswell of support by commercial operators *and* educators for the Petitioner's proposal that the new streamlined application processing system should be extended to all ITFS major modification applications, and not just restricted to applications for response station hubs and high-power boosters.^{3/} Many MDS *and* ITFS interests have joined the Petitioners in recognizing that certain of the rules intended to protect ITFS licensees from block downconverter overload are overly broad and must be revisited in order to avoid substantial harm.^{4/} Educators *and* system operators have agreed with the Petitioners' call for an expansion of the ability of ITFS licensees operating in an analog mode to engage in channel swapping and channel shifting.^{5/} The Petitioners' proposed revisions to Sections 21.913(b) and 74.985(b) of the Rules to clarify that response station hubs can be licensed to entities that are not high-power booster licensees also drew support.^{6/}

^{3/} See, e.g., Petition of ADC Telecommunications, *et al.* for Reconsideration, MM Docket No. 97-217, at 17-19 (filed Dec. 28, 1998)[hereinafter cited as "Petitioners Petition"]; Petition of National ITFS Ass'n for Reconsideration, MM Docket No. 97-217, at 8 (filed Dec. 28, 1998)[hereinafter cited as "NIA Petition"]; Petition of Region IV Education Service Center, *et al.* for Reconsideration, MM Docket No. 97-217, at 3-6 (filed Dec. 28, 1998)[hereinafter cited as "Joint ITFS Petition"]; Petition of University of Texas Television, MM Docket No. 97-217, at 3-4 (filed Dec. 28, 1998)[hereinafter cited as "UT Television Petition"]; Petition of San Francisco-San Jose Educator/Operator Consortium, MM Docket No. 97-217, at 2-3 (filed Dec. 28, 1998)[hereinafter cited as "Educator/Operator Consortium Petition"]; Petition of C&W Enterprises, Inc. for Reconsideration, MM Docket No. 97-217, at 5-7 (filed Dec. 28, 1998)[hereinafter cited as "C&W Petition"]; Petition of BellSouth Corp. and BellSouth Wireless Cable for Reconsideration, MM Docket No. 97-217, at 2-7 (filed Dec. 28, 1998)[hereinafter cited as "BellSouth Petition"].

^{4/} See Petitioners Petition, at 3-17; Joint ITFS Petition, at 6-7; Educator/Operator Consortium Petition, at 6-8; C&W Petition, at 2-3; Petition of Qualcomm Incorporated for Reconsideration, MM Docket No. 97-217, at 4-12 (filed Dec. 28, 1998). In addition, in its early-filed "Opposition to Petitions for Reconsideration," ITF endorses the proposals by Qualcomm, Inc. See Opposition of ITF to Petitions for Reconsideration, MM Docket No. 97-217, at 8 (filed Jan. 11, 1999)[hereinafter cited as "ITF Opposition"].

^{5/} See Petitioners Petition, at 20; ITFS Joint Petition, at 2-3; UT Television Petition, at 1-2; C&W Petition, at 4-5.

^{6/} See Petitioners Petition, at 21; C&W Petition, at 2. C&W Enterprises, Inc. also calls upon the Commission to issue a "clarification" that booster stations licensed under the prior rules will be permitted to continue to operate without securing a new license upon the effective date of the new rules. See *id.* While the Petitioners believe that the rules clearly permit the licensee of a booster to continue to operate upon the effective date of the new rules, they have no objection to the issuance

In addition, several meritorious proposals were advanced in petitions for reconsideration that were not contained within the Petitioners' petition for reconsideration. For example, the Petitioners certainly support the proposal advanced by BellSouth that the Commission permit ITFS excess capacity leases to include provisions that require the lease to be assigned and assumed in conjunction with any assignment and assumption of the ITFS license;^{7/} indeed, the Petitioners advocated this very proposal in the Petition for Rulemaking that commenced this proceeding.^{8/} The Petitioners also support the proposition that the Commission expedite the resolution of complaints where impermissible interference is alleged to have occurred (although, as discussed *infra*, the Petitioners are troubled by certain aspects of the procedural proposals advanced by CTN).^{9/}

However, not all of the proposals being advanced at this juncture have merit. In particular, the Petitioners believe that adoption of certain of the suggestions being advanced by ITF, CTN and Spike could have significant adverse impacts upon commercial operators and educators alike. The remainder of this pleading will be devoted to addressing those concerns.

of such a "clarification." At the same time, the Commission should make clear that those boosters licensed under the old regime are not entitled to protection within a booster service area ("BSA") at this juncture. The Petitioners propose that in order to secure a BSA, a booster licensee should be required to file a notification during the first filing window which sets forth the information specified in newly-adopted Sections 21.913(b)(4) - (6), 21.913(e)(1) - (3), 74.985(b)(2), (3) and (6) or 74.985(e)(1) - (3), as appropriate. A BSA proposed during this window will not be entitled to protection *vis a vis* applications proposed during the window, but will be entitled to protection against subsequent proposals.

^{7/} See BellSouth Petition, at 15-17.

^{8/} See Petitioners Comments, MM Docket No. 97-217, at 158-160 (filed Jan. 8, 1998) [hereinafter cited as "Petitioners Comments on NPRM"].

^{9/} See NIA Petition, at 8; Educator/Operator Consortium Petition, at 4-5; BellSouth Petition, at 7-10. The Petitioners were concerned, however, by BellSouth's apparent suggestion that the proposed expedited dispute resolution process would be employed to address situations where impermissible interference is predicted to be caused by a proposed facility. See BellSouth Petition, at 9. In those cases, the appropriate remedy should be to submit a petition to deny the application for the facility predicted to cause the interference, in which case the pleading cycle set forth in Sections 21.30 and 74.912 would govern. The Petitioners understand that BellSouth did not intend to imply that expedited dispute resolution should apply to predicted interference and will be clarifying its position.

II. DISCUSSION.

A. The ITF Petition.

Perhaps the most important element of the *R&O* is the Commission's adoption of a new system to govern the filing and prosecution of applications for response station hubs and high-power boosters. That system, which is substantially based on the proposal first advanced by the Petitioners in the Petition for Rulemaking that commenced this proceeding,^{10/} is critical to the success of the new regime. That system will avoid the application processing backlogs that have plagued the ITFS in the past. As the *R&O* admits, "failure to adopt an expedited processing system will be seriously detrimental to the provision of two-way service."^{11/}

The new system has been carefully designed to minimize the potential for interference. Indeed, existing MDS and ITFS stations are entitled under the new system to exactly the same interference protection they were entitled to under the old system – a proposed facility must demonstrate that it will meet the 45 dB co-channel desired-to-undesired ("D/U") signal ratio and the 0 dB adjacent-channel D/U ratio benchmarks for all previously proposed and licensed stations. However, in order to avoid gridlock in the processing of applications filed on the same day (or during the first filing window), the *R&O* adopts a new paradigm for defining the interference

^{10/} See *Two-Way Petition for Rulemaking*, at Appendix B. There are two noteworthy differences between the Petitioners' approach and that ultimately adopted by the Commission. First, applications filed under the new system will not be automatically granted upon expiration of the petition to deny period if no petition is filed, but will require affirmative action by the Commission's staff. Because the Petitioners have been assured by the staff that the intention is to grant most applications within days of the expiration of the petition to deny period, the Petitioners have not sought reconsideration of that change. Second, under the new rules an applicant will be required to serve the interference studies underlying its proposal on neighboring licensees and file those studies with the Commission's copy contractor, but will not have to file them as an official portion of its application. Instead, the applicant must certify the results of those studies in its application. The Petitioners note that CTN has called upon the Commission to mandate the filing of all underlying interference analyses with the Commission. See CTN Petition, at 17-20. Since applicant certifications are required, since the Commission has specifically reserved the right to require each applicant to file the studies upon request (see *R&O*, at ¶ 68), and since the filing of studies with each application will make substantially more difficult the Commission's efforts to implement an electronic filing system, the Petitioners support retention of the current rule.

^{11/} *R&O*, at ¶ 61.

protection rights of simultaneously-proposed facilities. In addition, the new system has the added benefit of eliminating the potential for the filing of “greenmail” applications that have the intention of slowing a neighboring licensee’s deployment of response station hubs and/or high-power boosters.^{12/}

Indeed, the benefits of that new system are so substantial that the Petitioners (which include over approximately 60 ITFS licensees) and a wide range of others (including such well-regarded members of the ITFS community as George Mason University Instructional Foundation, Indiana Higher Education Telecommunications System, Humanities Instructional TV Educational Center, Region IV Education Service Center, Minnesota Public Radio, University of Texas Television, Views on Learning, the Roman Catholic Communications Corporation, the Regents of the University of California, the Association for Continuing Education, San Jose State University, the National ITFS Association and even CTN, among others) have all called for the extension of the new system to all ITFS major modification applications.^{13/}

Despite this broad-based support across both the commercial *and* educational communities for the expedited application processing system, ITF urges the Commission to gut the new rules. Repeating discredited arguments that it advanced in the proceedings leading up to the *R&O*,^{14/} ITF contends that the Commission’s approach “provides no safeguards to prevent interference that would occur between conflicting, mutually exclusive applications filed during the same window” and therefore “not only contravenes the public interest, but also disregards one of the most essential rationales behind the creation of the FCC under Title III of the Communications Act – to protect against interference between and among its licensees and regulated services, as well as logic

^{12/} See Petitioners Comments on *NPRM*, at 41-43.

^{13/} See *supra* note 3.

^{14/} See Comments of Instructional Telecommunications Foundation, MM Docket No. 97-217, at 5-9 (filed Jan. 8, 1998); Reply Comments of Instructional Telecommunications Foundation, MM Docket No. 97-217, at 9 (filed Feb. 9, 1998).

itself.”^{15/} Unfortunately, for all its hyperbole, ITF conveniently ignores that the Commission’s new system includes rules that are highly protective against interference and is largely derived from licensing systems that have been successfully employed by the Commission in other services.

The record developed in response to the *NPRM* demonstrates conclusively that the ITFS processing delays which have so frustrated educators and commercial interests alike were largely caused by the difficulties associated with applying site-specific interference protection rules to determine which applications filed during a given window should be considered in comparative proceedings against other applications filed during the same window.^{16/} Under those site-specific rules, the staff examines each and every application filed during a particular window and conducts detailed interference analyses to determine whether a given proposed facility will meet the 45 dB co-channel D/U ratio and the 0 dB adjacent-channel D/U ratio benchmarks with respect to every other application filed during the same window. Given the limited staff resources available to the Mass Media Bureau’s Distribution Services Branch, this process has proven extremely time-consuming and takes the staff away from other important tasks. The record before the Commission also reflects that, as time-consuming as this task had been under the old one-way rules, the processing burden on the staff would increase exponentially under the far more complex two-way rules.^{17/} Thus, the *R&O* adopts a different approach – one based on the well-recognized benefits of geographic licensing compared to the existing site-specific licensing approach.

The new rules are based upon geographic licensing systems used by the Commission to expedite the deployment of other services. In a wide variety of situations involving services such as Personal Communications Service (“PCS”), Local Multipoint Distribution Service (“LMDS”), Wireless Communications Service (“WCS”), General Wireless Communications Service (“GWCS”)

^{15/} ITF Petition, at 3.

^{16/} See Petitioners Comments on *NPRM*, at 15-18.

^{17/} See *id.*, at 38.

and 39 GHz, the Commission has moved towards licensing schemes that allow licensees to construct and operate new or modified facilities within their authorized geographic service areas without even the submission of an application.^{18/} Co-channel interference in these services is generally limited by restricting power levels at the boundaries of the geographic service areas, while adjacent-channel interference is generally controlled by limiting power levels and out-of-band emissions.^{19/} Indeed, since 1995, the Commission has used geographic licensing with great success in the MDS — co-channel interference between BTA authorization holders is no longer controlled by the site-specific 45 dB D/U ratio, but instead by the -73 dBW/m² power flux density benchmark.^{20/} Not only has this system substantially improved MDS application processing times, but it has done so without inter-BTA interference.^{21/}

^{18/} See, e.g., *Amendment of the Commission's Rules to Establish New Personal Communications Services*, 9 FCC Rcd 4957 (1994)[hereinafter cited as "*PCS Reconsideration Order*"]; *Rulemaking to Amend Parts 1, 2, 21 and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, 12 FCC Rcd 12545, 12647 (1997); *Revision of Part 22 and Part 90 of the Commission's Rules to Facilitate Future Development of Paging Systems*, 12 FCC Rcd 2732, 2764 n. 157 (1997)[hereinafter cited as "*Paging Second R&O/FNPRM*"]; *Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40 GHz Bands*, 12 FCC Rcd 18,600, 18,633-34 (1997); *Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service*, 12 FCC Rcd 10785, 10841-65 (1997); *Allocation of Spectrum Below 5 GHz Transferred From Federal Government Use*, 11 FCC Rcd 624, 633 (1995).

^{19/} See, e.g., 47 C.F.R. §§ 22.359, 24.132, 24.133, 24.236, 24.238, 26.53, 26.55, 27.50, 27.53, 27.55, 101.111, 101.113.

^{20/} See *Amendment of Parts 21 and 74 of the Commission's Rules With Regard to Filing Procedures in the Multipoint Distribution Service and Instructional Television Fixed Service; Implementation of Section 309(j) of the Communications Act — Competitive Bidding*, 10 FCC Rcd 9589, 9615-17 (1995) [hereinafter cited as "*MDS Auction Order*"].

^{21/} There is additional precedent in the annals of MDS for the approach adopted in the *R&O*. When the Commission developed a system for the initial licensing of E and F Group MDS stations, it held a separate lottery for each channel group among all applicants proposing to locate within a given Standard Metropolitan Statistical Areas ("SMSA") or within 15 miles of the SMSA boundary. The Commission recognized that although this would result in the authorization of stations that might not meet the 45 dB and) dB benchmarks it avoided the "grid-lock" that would otherwise result if the staff were required to identify and resolve daisy chains of mutually-exclusive applications using site-specific rules. See *Gen. Docket No. 80-112 Report and Order*, 94 F.C.C. 2d at 1262-65; *PR Docket No. 90-54 Report and Order*, 5 FCC Rcd at 6412.

The new rules adopted by the *R&O* for response station hub and high-power booster applications are drawn from those precedents, utilizing the MDS/ITFS protected service area (“PSA”) as the geographic service area in which each MDS and ITFS licensee would have the ability to more flexibly modify facilities. Contrary to ITF’s implication that interference will be rampant between stations applied for at the same time, the *R&O* has protected against adjacent-channel interference by limiting the EIRP of response station and high-power booster facilities and by imposing restrictions on out-of-band emissions.^{22/} And, co-channel interference is controlled under the new rules by requiring any applicant for a response station hub or high-power booster to demonstrate that the power flux density will not exceed -73 dBW/m² at the boundary of its PSA.^{23/} In other words, the rules designed to minimize interference among simultaneously-proposed MDS and ITFS facilities are virtually indistinguishable from those used in other services.^{24/} Given that the Commission has recognized the need for competitive services to have substantially similar licensing regimes so as to assure a level playing field, the case for retention of the licensing system adopted in the *R&O* is compelling.^{25/}

The case for retention of the new system is reinforced by the flaws in ITF’s proposed

^{22/} See 47 C.F.R. §§ 21.908 (MDS out-of-band emissions limits); 21.909(g)(3) (MDS response station EIRP limitation); 21.909(g)(5) (MDS response station emissions limit); 21.913(e)(5)(i) (MDS signal booster power limit); 21.940(c)(2) and (3) (I channel output power and EIRP restrictions); 74.935 (ITFS power limits); 74.936(c), (d) and (f) (ITFS out-of-band emissions limits); 74.939(k) (I channel out-of-band emissions limits); 74.990(c)(2) and (3) (ITFS response station output power and EIRP limits).

^{23/} See 47 C.F.R. §§ 21.902(b)(5) (power flux density (“PFD”) limit at PSA boundary); 21.913 (a) (MDS signal booster PFD limit); 21.913(e)(5)(v) (aggregate MDS signal booster and response station PFD limit); 21.938 (PFD limit for MDS facilities); 74.903(a)(6)(i) (ITFS contour limit); 74.985(b)(14) (ITFS signal booster PFD limits); 74.985(e)(5)(vi) (aggregate PFD limits for ITFS facilities). The only exception to this requirement is where the licensee of the adjacent PSA consents.

^{24/} Indeed, because the new rules require each applicant to demonstrate compliance with the site-specific 45 dB and 0 dB D/U ratios with respect to all previously-proposed or licensed facilities, the MDS and ITFS licensing system is far more protective of than the usual geographic area system.

^{25/} See, e.g., *Implementation of Sections 3(n) and 332 of the Communications Act*, 9 FCC Rcd 7988, 8043 (1994); *Paging Second R&O/FNPRM*, 12 FCC Rcd at 2748.

alternative. ITF envisions a system under which the Commission would utilize the site-specific rules to determine which applications submitted during the initial filing window exceed the 45 dB and 0 dB D/U criteria with respect to one or more other applications submitted during the window, and then utilize some unspecified process for determining which of those applications are to be granted and which are to be denied.^{26/} The two most glaring problems with this approach are that: (1) it will take substantially longer and require far greater Commission staff resources to process applications under ITF's proposal than under the approach adopted in the *R&O*; and (2) it will require the Commission either to use auctions or, if Congress permits, establish rational criteria for selecting from among competing applications for response station hubs and high-power boosters.^{27/}

Although ITF contemplates that the Commission will be able to identify competing proposals prior to the expiration of the deadline for submitting petitions to deny,^{28/} history has shown that the limited staff resources available are inadequate to meet that timetable for determining which applications will be subjected to the competitive process. Even when operating under the far less complex one-way rules, it took eleven months before the Commission could even announce the first mutually exclusive ITFS applications that had been submitted during the October 1995 filing window,^{29/} and eight months before the Commission could announce the first set of mutually exclusive ITFS applications submitted during the November-December 1996 filing window.^{30/}

^{26/} See ITF Petition, at 10-11.

^{27/} Although the focus of the Petitioners in this pleading is on opposing ITF's call for a return to site-specific licensing for response station hubs and high-power boosters, the arguments being advanced here are equally applicable to support the Petitioners' proposal to extend the streamlined processing rules to all ITFS major modification applications. However, in the interest of brevity the Petitioners will defer addressing those issues until they reply to ITF's opposition to the Petitioners' petition for reconsideration of the *R&O*.

^{28/} See ITF Petition, at 11.

^{29/} See "ITFS Applications Accepted For Filing," *Public Notice*, Report No. 23829B (rel. Sept. 19, 1996).

^{30/} See "Instructional Television Fixed Service: Proposed Construction Permits and Licenses," - *Public Notice*, Report No. 24065B (rel. Aug. 28, 1997).

Given the increased complexity of the interference analyses that will be required under the new rules, it would be a daunting task for the Commission to identify competing applications using the site-specific rules (particularly when numerous applications are expected to be filed during the initial window and “daisy chains” under the site-specific rules are almost inevitable). As the Commission recognized when it adopted the MDS geographic area licensing rules that have worked so well since 1996, to implement any licensing system which results in a larger number of mutually-exclusive applications and daisy-chains “would likely require significant Commission resources and a substantial amount of time.”^{31/} And, the history of MDS and ITFS shows that when substantial delays to legitimate proposals can be caused simply by filing of competing application, the potential for “greenmail” applications increases.

Moreover, ITF cavalierly ignores that even once the identification of the competing parties is complete, any system for choosing from among competing applicants, be it a paper hearing, lottery, auction or other construct, will inevitably add months, if not longer, to the licensing process. Thus, while the approach adopted in the *R&O* should permit the licensing of response station hubs and two-way boosters within just a few months of the initial filing window, adoption of ITF’s proposal would substantially delay the inauguration of advanced service over MDS and ITFS spectrum. Given the competitive marketplace in which MDS/ITFS broadband services will compete, such a licensing delay could prove devastating.

Second, ITF’s proposal that competing applications “would be processed according to the current rules, or by some other tie-breaking procedure . . .” begs the question of how a “winner” would be selected from among competing applications. The Commission’s *First Report and Order* in MM Docket No. 97-234^{32/} concludes that the Commission is obligated by Section 309(j) of the

^{31/} *MDS Auction Order*, 10 FCC Rcd at 9606.

^{32/} See *Implementation of Section 309(j) of the Communications Act -- Competitive Bidding for Commercial Broadcast and Instructional Television Fixed Service Licenses; Reexamination of the Policy Statement on Comparative Broadcast Hearings; Proposals to Reform the Commission's Comparative Hearing Process to Expedite the Resolution of Cases*, MM Docket No. 97-234, FCC

Communications Act of 1934, as amended by the 1997 Balanced Budget Act,^{33/} to resolve competing ITFS modification applications by using an auction system.^{34/} Whatever merit auctions may have generally, there has been a consensus within the MDS *and* ITFS communities that auctions are an inappropriate vehicle for awarding ITFS authorizations. Thus, unless the law is changed, a grant of ITF's petition will necessarily require the Commission to utilize auctions to resolve competing ITFS applications.

Moreover, even if the National ITFS Association and others succeed in their current efforts to amend Section 309(j) so that the Commission could use non-auction mechanisms for selecting from among competing ITFS applications, the Commission would be required to adopt new rules for selecting "winners." The current point system of Section 74.913 was not designed to address competing proposals for modified facilities — much less competing proposals for the type of advanced facilities permitted under the *R&O* — and would be subject to attack as arbitrary and capricious if applied to resolve competing applications for response station hubs and high-power boosters.^{35/} The insurmountable difficulties inherent in attempting to revise that point system and quantify the relative merits of the very different kinds of proposals that use response station hubs and high-power boosters are a matter of record. As the Petitioners previously noted:

The Commission would, figuratively speaking, be required to compare not just apples and oranges, but an entire melange of fruits. For example, the Commission would be required to determine which is more in the public interest, a response station hub designed to serve one school district, or a booster station designed to provide downstream high speed Internet access to a different school district? What if the high speed Internet access service were targeted at thousands of businesses, rather than a relatively small number of schools? What if one proposal is advanced by an incumbent licensee, while the other is submitted by a BTA auction winner? What if one proposal seeks to cellularize in order provide a "video on demand"

98-194, at ¶¶ 197-208 (rel. Aug. 18, 1998) (adopting competitive bidding procedures for ITFS)[hereinafter cited as "*ITFS Auction Order*"].

^{33/} Balanced Budget Act of 1997, Sec. 3002(a)(1), codified as 47 U.S.C. Sec. 309(j).

^{34/} *ITFS Auction Order*, at ¶¶ 197-205.

^{35/} See *Bechtel v. FCC*, 10 F.3d 875 (1993).

service, while a competing proposal seeks to cellularize to expand capacity for a high speed Internet access service? What if one competing proposal is the lynchpin of a broadband system in which all of the licensees in a market are participating, save the other competing applicant? The list of factors that should be considered in any qualitative analysis borders on the endless.^{36/}

The *R&O*'s adoption of a geographic area-based system eliminates any need for the Commission to struggle with these issues by eliminating the need to choose from among competing proposals for response station hubs and high-power boosters.

In short, the ITF proposal is substantially flawed. Indeed, if ITF's proposal were adopted, the only winners would be those attempting to delay the inauguration of service by their neighbors for greenmail purposes and those with pockets deep enough to outbid financially-strapped local educators in the auctions that would inevitably result.

B. The CTN Petition.

Although the petition for reconsideration filed by CTN contains a handful of proposals that, standing alone, have merit,^{37/} on the whole it represents another attempt by a handful of ITFS licensees to impose restrictions that run counter to the demonstrated best interests of commercial operators and the educational community.

^{36/} Petitioners Comments on *NPRM*, at 39.

^{37/} For example, the Petitioners do not object to adoption of CTN's proposed amendment to the file format set forth in Appendix D to permit the specification of the amount and direction of any mechanical beam tilt. *See* CTN Petition, at 23. Nor do the Petitioners object to CTN's proposed changes to Section 21.904 to change the heading and to replace the reference to "transmitter power" in subsection (c) with "EIRP." *See id.* at 24. In addition, the Petitioners agree with CTN that an excess capacity lease entered into on or before March 31, 1997 should be "grandfathered" from compliance with the new rules, even if it contains a provision automatically extending the term as a result of the FCC's decision to increase the maximum term of ITFS leases from 10 to 15 years. *See id.* at 20-21. Along similar lines, the Commission should clarify that a lease that is otherwise "grandfathered" does not lose that status because it includes a provision under which the lease is automatically renewed after March 31, 1997 unless a party affirmatively terminates the lease or the Commission fails to renew the ITFS license.

1. *Many Of The Proposals Advanced By CTN's Petition Merely Repeat Proposals Previously Rejected By The Commission, Without Any Substantive Discussion By CTN Of Why The Commission Was Allegedly Wrong.*

Much of the CTN Petition merely repeats, without any substantive discussion, proposals that were previously advanced by CTN, but rejected in the *R&O*. For example, CTN again calls upon the Commission to impose mandatory guardbands between upstream and downstream operations (although CTN is hardly clear as to which of its several guardband proposals it now advocates).^{38/} The *R&O* soundly rejected all of CTN's proposals for the mandatory imposition of guardbands, explaining that:

After carefully considering CTN's concerns about potential interference problems, we have decided to deny their request that guardbands be established separating upstream (response station) transmissions from downstream ITFS transmissions... In summary, we believe guard bands would deprive parties the flexibility to design and operate their systems in a manner that best meets their needs, and would deprive them of spectrum which, in some, if not most, geographical areas could be partially or wholly utilized for two-way operations without danger of interference to ITFS sites.^{39/}

Despite the Commission's detailed analysis of the issue, *CTN's Petition offers not one word of explanation as to why it believes guardbands should be mandated*. Suffice it to say that the Petitioners have previously demonstrated on numerous occasions that mandatory guardbands are unnecessary and would preclude many ITFS licensees from deploying two-way facilities,^{40/} and urge the Commission for the reasons set forth in the *R&O* and in the record to retain the existing rule.

The same flaw infects CTN's renewed call for the Commission to require that before a response station installed near an ITFS receive site can be activated, it must undergo a testing

^{38/} See CTN Petition, at 2 n.3.

^{39/} *R&O*, at ¶ 54 (footnotes omitted).

^{40/} See Petitioners Comments on *NPRM* at 72-107; Reply Comments of Petitioners, MM Docket No. 97-217 at 44-63; Letter from Paul J. Sinderbrand, Counsel to Petitioners, to Magalie Roman Salas, MM Docket No. 97-217, at 4-8 (filed July 17, 1998); Letter from Paul J. Sinderbrand, Counsel to Petitioners, to Magalie Roman Salas, MM Docket No. 97-217, at 6-7 (filed April 27, 1998); Letter from Paul J. Sinderbrand, Counsel to Petitioners, to Magalie Roman Salas, MM Docket No. 97-217, at 6-10 (filed March 6, 1998).

process in conjunction with the ITFS licensee.^{41/} This approach was opposed by a wide variety of ITFS and commercial interests during the proceeding,^{42/} and was specifically rejected in the *R&O*, which held that “the best course of action now would be to permit an adequate and thorough evaluation of the notification procedure prior to any consideration of a testing requirement or other more restrictive actions.”^{43/} The CTN Petition is devoid of any explanation as to why the Commission was in error. Given the arguments advanced by the ITFS and commercial interests who opposed CTN initially and who have petitioned the Commission on reconsideration to reduce the

^{41/} See CTN Petition, at 2 n.3.

^{42/} See Comments of the University of North Carolina, MM Docket No. 91-217, at 2 (filed July 2, 1998)(“The Petitioners’ proposal is highly protective against interference, and the burdensome proposal of CTN will impose costs far greater than the minuscule benefits of additional protection.”); Comments of George Mason University Instructional Foundation, Inc., MM Docket No. 91-217, at 5 (filed July 2, 1998)(“having reviewed the Petitioners’ proposals, we believe that they fully protect our educational objectives and adequately address the legitimate concerns raised by educators.”); Comments of NJN Public Television and Radio, MM Docket No. 91-217, at 1 (filed July 2, 1998)(“the interference protection rules and policies proposed by the Petitioners in their *ex parte* filings fully protect our interests”); Comments of Valley Lutheran High School, MM Docket No. 91-217, at 2 (filed July 2, 1998)(“We believe that the Petitioners’ proposed interference protection rules and policies provide adequate protection of the ITFS interests and urge adoption of the proposals.”); Wilson Technical Community College, MM Docket No. 91-217, at 1 (filed July 2, 1998)(“Wilson believes that the Petitioners are to be applauded for crafting a regulatory approach that deftly balances the pressing need for expedited processing of applications and the deployment of new services against the requirement for reasonable protection against interference. . . . Wilson is particularly concerned that proposals advanced by [CTN], which apparently has secured licenses for the facilities it desires, would substantially delay ITFS licensing of others, without any significant improvement in the operating environment.”); Comments of Pitt Community College, MM Docket No. 91-217, at 1 (filed July 2, 1998)(“Pitt believes that the Petitioners’ proposed interference protection rules and policies are fully protective of our interests, and we support their adoption.”); Comments of Vance-Granville Community College, MM Docket No. 91-217, at 1-2 (filed July 2, 1998); Comments of Humanities Instructional TV Educational Center, Inc., MM Docket No. 91-217, at 1 (filed July 2, 1998)(“We urge the Commission’s adoption of Petitioners’ proposals.”); Comments of Indiana Higher Education Telecommunication System, MM Docket No. 91-217, at 1 (filed July 2, 1998)(“Since the Petitioners’ proposed interference protection rules and policies provide adequate protection of the ITFS interests, adoption of the proposals would serve the public interest.”); Comments of UT/TV Houston, MM Docket No. 91-217, at 1 (filed July 2, 1998)(“the Petitioners’ proposed interference protection rules and policies provide adequate protection of the ITFS interests.”); Comments of Region IV Education Service Center, MM Docket No. 91-217, at 3 (filed July 2, 1998)(“the Petitioners’ proposal fully protect our educational objectives and adequately address the legitimate concerns raised by educators.”).

^{43/} *R&O*, at ¶ 55.

burdens imposed prior to the installation of response stations,^{44/} the merit in the Commission's approach are clear.

Similarly, CTN provides no rationale as to why the Commission should revisit its rejection of CTN's so-called "two-step licensing procedure."^{45/} The *R&O* found that "[r]egardless of the very real possibility that employing CTN's proposal will create an unacceptable level of uncertainty in the capital market, we believe it is unnecessarily cautious in light of the requirement that two-way stations causing interference to existing or previously proposed sites be required to shut down until such interference is resolved."^{46/} CTN does not even acknowledge the Commission's findings, much less explain why they are wrong. Again, the record before the Commission establishes beyond doubt that CTN's approach is counter to the best interests of licensees and the public, and was properly rejected.

2. *The Commission Should Reject CTN's Call For Unqualified Protection Against Downconverter Overload Of ITFS Receive Sites Registered After An Application For A Response Station Hub Has Been Filed.*

The Commission should reject CTN's proposal to amend Sections 21.909(n) and 74.939(p) to "clarify" that a response station may not be activated within 1960 feet of any ITFS receive site registered at the time of activation unless 20 days advance notice is provided to the licensee of the ITFS receive site.^{47/} The Petitioners strongly disagree. To the contrary, the Petitioners have demonstrated in their Petition for Reconsideration that the Commission should not promote the use of spectrally inefficient downconverters by ITFS licensees, and that the advance notice requirement should be inapplicable to the activation of any response station near a ITFS receive site registered or constructed after the filing of the application for the associated response station hub. Once the

^{44/} See *supra* note 4.

^{45/} See CTN Petition, at 3, n.2.

^{46/} *R&O*, at ¶ 70 n. 165.

^{47/} See CTN Petition, at 10.

hub proposal is a matter of record, the ITFS licensee can and should be installing downconverters designed and filtered to prevent overload. In the interest of brevity, those arguments will not be repeated here, but are instead incorporated by reference.^{48/}

3. *The Commission Should Mandate The Use Of A Single Propagation Model For Use In Conducting Analyses.*

Although the Petitioners do not oppose CTN's proposal that several rule sections be amended to require the use of a terrain-sensitive model in performing all interference calculations,^{49/} the Petitioners do not agree with CTN that the use of any one of the many available propagation models should be permitted. Indeed, the Methodology annexed to the *R&O* as Appendix D contemplates that the Epstein-Peterson propagation model must be used.

CTN can cite to only a single phrase in the Methodology, "a propagation model shall be used," in support of its argument that the Methodology permits the use of any propagation model.^{50/} However, a fair reading of the paragraphs following that phrase makes clear that the intent is for the Epstein-Peterson model to be employed. In crafting the Methodology, the Petitioners selected the Epstein-Peterson model because it is widely used within the industry and can be implemented with the least cost and disruption to the MDS/ITFS engineering community.

More important than which model should be used (and CTN provides no explanation as to why the Epstein-Peterson model should not be required), is the fact that the use of a single model will minimize disputes under the new rules. CTN provides absolutely no explanation as to how the public interest would be served by allowing applicants to depart from a standard methodology for predicting interference, and the Petitioners are at a loss to find one. To the contrary, the use of a standard model for predicting interference will provide a high degree of certainty to applicants and licensees and will avoid unnecessary disputes before the Commission regarding the efficacy of any

^{48/} See Petitioners Petition, at 8.

^{49/} See CTN Petition, at 21.

^{50/} CTN Petition, at 22 (citing *R&O*, Appendix D, at 10).

particular model.

The use of a common propagation model for the prediction of potential interference will significantly reduce the burden of reviewing applications that would otherwise be imposed upon neighboring MDS and ITFS licensees. With a Commission-mandated common model, a neighboring licensee need only ascertain that the mathematical calculations were performed correctly. Absent a Commission-mandated common model, however, the neighboring licensee will not only want to validate the math, but will also be required to delve into the logical underpinnings of the model to determine whether it yields an accurate prediction of potential interference. Given the concern expressed by the ITFS community in particular that the application processing system deployed by the Commission should minimize burdens on ITFS licensees where possible,^{51/} the benefits of a standard methodology are patent.

Moreover, the use of a standard methodology has the benefit of expediting service to the public and conserving Commission resources by minimizing the number of disputes that will require staff intervention. To the extent the only issue open for debate is whether the mathematics were performed correctly, there should be relatively few instances in which a petition to deny is filed against an application. If, however, the accuracy of the underlying model as a predictor also is open for debate with respect to an application, a dramatic increase in the number of petitions to deny (and a concomitant delay in the initiation of service) can be expected.

To avoid the misinterpretation advanced by CTN, the first sentence in the Propagation Model section of Appendix D should be amended to read "When analyzing interference from response stations to other systems and from other systems to response station hubs, the propagation model

^{51/} See, e.g., Comments of Corporation for Public Broadcasting, Association of America's Public Television Stations, and Public Broadcasting Service, MM Docket No. 97-217, at 10-15 (filed Jan. 8, 1998); Comments of Region IV Educational Service Center, *et al.*, MM Docket No. 97-217, at 2 (filed Jan. 8, 1998); Comments of San Francisco-San Jose Educator/Operator Consortium Comments, MM Docket No. 97-217, at 7, 12-18 (filed Jan. 8, 1998); Dallas Comments, MM Docket No. 97-217, at 4 (filed Jan. 8, 1998) (*incorporating by reference* Joint Comments of Dallas County Community College, *et al.*, RM-9060, at 6-9 (filed May 14, 1997)).

described below, which takes into account the effects of terrain and certain other factors, shall be used.”^{52/}

4. *The Complaint Resolution Procedures Proposed By CTN Should Be Adopted Only If Accompanied By Elimination Of Onerous Pre-Activation Requirements And If Modified To Provide Fundamental Fairness To Licensees.*

Recognizing that the new application processing procedures provide for less Commission analysis of potential interference before licenses are issued, the Commission has adopted stringent rules mandating that when a “documented complaint” of co-channel or adjacent-channel interference is filed with the Commission, the licensee of the allegedly interfering facility must “promptly remedy the interference or immediately cease operations.”^{53/} Although the wording of this rule is not dissimilar to that of other rules applicable to other services,^{54/} CTN complains that “this skeletal description of the process for resolving interference complaints is certain to lead to disputes about the process as well as the existence of interference,” and proposes rule changes setting forth in great detail the procedures to be followed when a “documented complaint” is filed.^{55/} In addition, CTN seeks to expand the rules by creating a right for a licensee to obtain Commission intervention even when a documented complaint is not filed.^{56/}

Quite frankly, the Petitioners believe that the rules adopted by the *R&O* are adequate as drafted. Indeed, these rules are more detailed than those adopted for virtually any other service, none

^{52/} CTN raises the question as to whether the mandatory use of the Epstein-Peterson model supersedes the discussion in Paragraph 81 of the *Report and Order* in MM Docket No. 93-24 (*See Amendment of Part 74 of the Commission's Rules with Regard to the Instructional Television Fixed Service*, 10 FCC Rcd 2907, 2921 (1995)) that allowed the use of any valid model in preparing interference analyses. *See* CTN Petition, Joint Engineering Statement, at 2. The Petitioners believe under the new regulatory environment, the benefits of consistency dictate repudiation of Paragraph 81.

^{53/} *See* 47 C.F.R. §§ 21.909(g)(7), 21.913(g), 47.939(g)(7), 74.939(l)(5), 74.985(g).

^{54/} *See, e.g.,* 47 C.F.R. §§ 73.157(b)(2), 73.317(a), 74.533(c), 27.58(g).

^{55/} *See* CTN Petition, at 4.

^{56/} *See id.*, at 7-8.

of which appears to suffer from the lack of detailed complaint procedures. However, the Petitioners would not object to adoption of the onerous proposals advanced by CTN (with the modifications discussed below), *so long as the adoption of those proposals was accompanied by elimination of the rules requiring professional installation of response stations and 20 days advance notice prior to the activation of certain response stations.*

Throughout this proceeding, the Petitioners have stressed that in the event interference is caused by a facility authorized under the streamlined application processing system, the licensee of that facility should be required to promptly cease operating. Thus, the Petitioners support the existing rules as a tough, but fair, *quid pro quo* for expedited deployment of service. However, the revisions proposed by CTN go substantially further than the current rules in tilting the balance in favor of the party complaining of interference. Most importantly, while the *R&O* contemplates that the Commission itself will order any cessation of operations needed to cure interference,^{57/} CTN calls for the mandatory halt to operations merely upon the service of an *ex parte* “documented complaint.” CTN’s proposal places tremendous — indeed, unprecedented — power in the hands of incumbent licensees. For example, an ITFS licensee could unilaterally force a commercial response station to shut down, inevitably leading the customer to seek a different service provider, merely by filing a documented complaint. Or, a commercial operator could force an ITFS licensee to cease using the two-way system it relies upon for Internet access, again merely by filing a documented complaint. While the Petitioners take solace in CTN’s proposal that a “documented complaint” must include both a certification that a good faith effort at resolution was attempted and evidence that the interference is being caused by a facility licensed to the party against whom the complaint is filed,^{58/} there is no denying that the proposal advanced by CTN would empower complainants in a way that is unique in Commission annals.

^{57/} See *R&O*, at ¶55.

^{58/} See CTN Petition, at 4-5.

Nonetheless, the Petitioners would not object to adoption of CTN's proposed rule changes relating to "documented complaints," so long as that adoption is accompanied by elimination of the onerous professional installation and advance notification rules that have proven so objectionable.^{59/} The record is rather clear that those prophylactic rules are excessive under the current environment, since the potential for ITFS downconverter overload is slight and the Commission requires the immediate cure of any interference that is caused by downconverter overload. Those rules become even more unnecessarily burdensome when an ITFS licensee can unilaterally shut down a commercial operation merely by filing a piece of paper with the Commission.

The one change to CTN's "documented complaint" procedure the which Petitioners believe is absolutely necessary involves the deadline for ceasing operations upon service of a documented complaint. CTN proposes that the licensee of the allegedly offending facility must shut it down within 2 hours of service of a complaint by fax or hand delivery.^{60/} That rule is unworkable. For example, if a fax is received when a licensee's fax machine is unattended (such as after business/school hours or on weekends), it is unreasonable to expect the licensee will be able to cease operation within two hours. Similarly, a hand delivery may be made at a time when no personnel are present with the capability of ceasing transmissions from a given facility. The Petitioners suggest that the licensee of the allegedly offending facility be given at a minimum, until midnight of the business day following that on which the complaint is received to cease operations.

While the Petitioners are agreeable under appropriate circumstances to CTN's proposed rule revisions relating to "documented complaints," they find unacceptable CTN's proposal for rules that could force a termination of service even where the complainant lacks evidence sufficient to submit a "documented complaint." CTN's proposal could lead to the outrageous situation in which an incumbent files a document without any certification that it has attempted to address the dispute with

^{59/} See *supra* note 4.

^{60/} See CTN Petition, at 6.

the defendant and without even the slightest shred of evidence that interference is being caused by the defendant, but the defendant still must cease operations unless it can prove that it is not the source of the interference within three days. While the Petitioners do not object to the current rules placing the burden of proof of non-interference on the newcomer, it would be fundamentally unfair to force licensed facilities off the air without so much as a Commission finding as to the source of the interference in cases where the complainant lacks sufficient evidence to file a “documented complaint.”

5. *The Commission Should Not Restrict Point-to-Multipoint Operations On The I Channels To Secondary Status.*

Having had the *R&O* reject its proposal that all of the I channels be preserved exclusively for upstream use,^{61/} CTN now urges the Commission to do indirectly what it refused to do directly. Specifically, CTN urges the Commission to relegate point-to-multipoint use of the 125 kHz I channels to secondary status, claiming otherwise ITFS licensees could be precluded from deploying upstream facilities because they would be required to protect previously-proposed or licensed downstream co-channel or adjacent-channel I channel operations by other licensees.^{62/}

The Commission’s rationale for rejecting CTN’s prior proposal is instructive. The *R&O* stated that:

Further consistent with our flexible approach, we deny CTN's request to reallocate all of the 125 kHz channels to ITFS and to use them solely for response transmissions. As we stated in the *NPRM* with respect to a similar proposal similar [*sic*], we believe that such a reallocation and the ensuing complications are unduly restrictive and counter-productive.^{63/} Moreover, *allowing the I channels to be used for point-to-multipoint transmissions promotes greater options for two-way system design and more efficient use of the spectrum, as described above.*^{64/}

^{61/} See *R&O*, at ¶ 60.

^{62/} See CTN Petition, at 15-17.

⁶³ See *Amendment of Parts 1, 21 and 74 To Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage In Fixed Two-Way Transmissions*, 12 FCC Rcd 22,174, 22,200 (1997) [hereinafter cited as “*NPRM*”].

^{64/} *R&O*, at ¶60 (emphasis added).

Adoption of CTN's proposal would, as a practical matter, frustrate the deployment of point-to-multipoint use of the I channels. Licensees would be reluctant to develop point-to-multipoint facilities if, at a moment's notice, they could be required to cease operations in order to protect a newcomer using I channels for upstream use. Thus, the "more efficient use of the spectrum" envisioned by the *R&O* would not occur. Given that ITFS licensees have had 35 years to develop response station use of the I channels, and that only a handful of upstream I channel operations are in existence, adoption of CTN's proposal would effectively continue the non-use of the I channels.

C. The Spike Petition.

1. *There Is No Basis For Granting Spike's Request That Frequency Tolerance Requirements Be Eliminated For Non-VSB Digital Facilities.*

The Spike Petition urges the Commission to eliminate the frequency tolerance requirement for non-VSB digital transmissions.^{65/} Although the Petitioners would not be opposed to a loosening of the frequency tolerance requirement for facilities utilizing digital modulation schemes that do employ a pilot carrier, the Petitioners disagree with Spike's contention that no frequency tolerance requirement is needed.

At the outset, Spike's argument is based on fundamentally flawed readings of the *Declaratory Ruling and Order* issued by the Commission in 1996 authorizing the routine use of digital modulation on MDS and ITFS channels and the record in this proceeding.^{66/} According to Spike, in authorizing digital operations, "the Commission declined therein to mandate frequency tolerance standards for most digital modulation methods."^{67/} That, however, is not an accurate reading of the Commission's decision. The Petition for Declaratory Ruling that commenced the proceeding culminating in the *Declaratory Ruling and Order* urged the Commission to retain the

^{65/} Spike Petition, at 3.

^{66/} See *Request for Declaratory Ruling on the Use of Digital Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations*, 11 FCC Rcd 18839 (1996)[hereinafter cited as "*Digital Declaratory Ruling*"].

^{67/} Spike Petition, at 2.

existing ± 1 kHz frequency tolerance requirement, but to refrain from imposing frequency offset obligations on licensees operating using digital modulation.^{68/} A fair reading of Paragraphs 31 and 32 of the *Declaratory Ruling and Order* makes clear that the Commission fully agreed with these proposals, except that it preserved the possibility of imposing frequency offset obligations on licensees employing Vestigial Sideband ("VSB") as their digital modulation scheme. Indeed, Spike's argument notwithstanding, there is nothing in the *Declaratory Ruling and Order* which can be read to exempt non-VSB digital operations from the ± 1 kHz frequency tolerance requirement

Interpreting the *Declaratory Ruling and Order* to retain the ± 1 kHz frequency tolerance requirement is consistent with the discussions of the issue in this proceeding. The Petitioners' Petition for Rulemaking had proposed that footnote 2 to Section 21.101 and Section 74.961 be amended to provide that the ± 1 kHz frequency tolerance requirement be imposed on all main and high power booster stations, but not on low power booster and response stations. The *Notice of Proposed Rulemaking* directly solicited comment on that specific proposal.^{69/} Then, in the *R&O*, the Commission addressed the Petitioners' proposal by stating that:

In the *NPRM*, we sought comment on Petitioners' request that the existing ± 1 kHz frequency tolerance requirement be retained for all main station digital and analog transmitters and for all digital and analog booster transmitters with an EIRP exceeding -9 dBW, and that for all booster transmitters with less than -9 dBW EIRP and for all response station transmitters, no frequency tolerance requirement be imposed. These concepts were generally supported in the Comments and Replies and we are adopting them in our rules. The extra interference potential of individual low power boosters and response stations which might arise from frequency instability is very limited, and thus imposing a tolerance requirement on them would result in added equipment cost and complexity with no corresponding benefit to the

^{68/} See Petition for Declaratory Ruling, DA 95-1854, at 29 n.53, 33 (filed July 13, 1995).

^{69/} See *NPRM*, 12 FCC Rcd at 22,185. ("With respect to frequency tolerance, Petitioners request that, for all primary station transmitters and all booster stations with power exceeding -9 dBW EIRP, the existing ± 1 kHz standard be continued because such stations often have large coverage areas and thus significant opportunities to cause interference to neighboring systems. For booster stations with - 9 dBW or less EIRP, and for all response stations, Petitioners argue that no frequency tolerance requirement should be imposed due to the limited coverage areas and limited interference range of these stations.") Thus, Spike mischaracterizes the record before the Commission when it contends that "[n]ot a single commenter in the proceeding advocated the imposition of frequency tolerance standards on non-VSB transmissions. See Spike Petition, at 2-3.

interference environment. This would be especially true for narrowband response stations which operate on subchannels within, and removed from the edges of, larger channels. For main station and high power booster transmitters, there is a much more significant potential interference impact and we believe that requiring the emissions from these stations to be held steady within their assigned channels is much more important.^{20/}

As this language illustrates, there are benefits from restricting frequency drift through a frequency tolerance requirement. Thus, some frequency tolerance requirement for main stations and high-power boosters should remain. However, the Petitioners do not disagree that it would be beneficial to loosen the frequency tolerance requirement to levels that can be achieved without using ovenized crystal oscillators.

2. *There Is No Inconsistency In The Spectral Mask Rules Requiring Adoption Of Spike's Proposed Revisions.*

One of the most important elements of the *R&O* is the new spectral mask for MDS and ITFS operations codified at Sections 21.908 and 74.936 of the Commission's Rules. Those rules include rather detailed formulas to be used in determining compliance, one for use when measurements are made with a power meter and a spectrum analyzer, and one for use when only a spectrum analyzer is used to take measurements. The *R&O* found that "[t]hese formulas take into account all the relevant factors necessary to assure that, no matter what exact measurement procedure is used, the results of the tests will be interpreted uniformly and in accordance with the rules we are adopting."^{21/} However, Spike urges the Commission to alter the two formulas to eliminate what Spike calls "inconsistency" in the rules, essentially repeating arguments Spike has previously advanced and the Commission has previously rejected.^{22/}

Annexed hereto as Attachment A is a paper prepared by S. Merrill Weiss, "Defining Appropriate Spectral Mask Measurement Techniques for MDS and ITFS." This paper establishes

^{20/} *R&O*, at ¶ 33.

^{21/} *Id.* at ¶ 32.

^{22/} *Compare* Spike Petition, at 4-5 *with* Comments of Spike Technologies, MM Docket No. 97-217, at 3-8 (filed July 2, 1998).

(i) that the "inconsistency" alleged by Spike does not exist when the Commission's new rules and policies are fairly read, (ii) that the testing which underlies the current MDS and ITFS digital interference protection policies is all based upon measurement of the spectral mask in accordance with the current formulas, (iii) that adoption of Spike's approach could result in the introduction of new interference, and (iv) that Spike's formulas are internally flawed. For these reasons, the Petitioners urge the Commission to reject Spike's proposed revisions to the formulas specified for determining compliance with the spectral mask.

III. CONCLUSION.

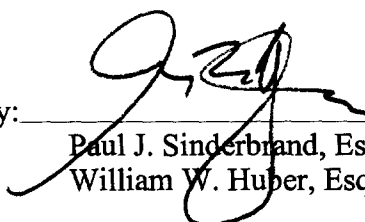
On the whole, the petitions for reconsideration of the *R&O* propose a variety of rule changes that, if adopted, will substantially improve the regulatory environment in which MDS and ITFS licensees will operate in the future as they deploy advanced digital facilities. However, for the reasons set forth above, the Commission should deny the ITF and Spike petitions, and reject in large measure the proposals advanced by CTN.

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February 4, 1999

ATTACHMENT A

Defining Appropriate Spectral Mask Measurement Techniques for MDS & ITFS

Prepared by
S. Merrill Weiss
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In the current FCC Rules, at Sections 21.908(a) through (d) and 74.936(c) through (f), as recently adopted in the FCC Report and Order in MM Docket No. 97-217, specifications are provided for the spectral masks to be used to determine allowable out-of-band emissions by various types of transmitters in the MDS and ITFS services. Furthermore, in Section 21.908(e), two different measuring techniques are given that can be applied to determine compliance with the spectral masks. Section 21.908(e) reduces the problem to a pair of formulas, one of which applies to measurements made with a combination of a power meter and a spectrum analyzer, and the other of which requires just the spectrum analyzer.

In Sections 21.908(a) through (d) and 74.936(c) through (f), the language defines the attenuation required at various spectrum points as being in "dB relative to the licensed average 6 MHz channel power level." Section 21.908(e) then states that "In measuring compliance with the out-of-band emissions limitations, the licensee shall employ one of two methods," which it then goes on to define, including the two aforementioned formulas. Similarly, Section 74.936(h) states that "Compliance with the out-of-band emissions limitations shall be established in accordance with Rule Section 21.908(e)."

In its Petition for Reconsideration in MM Docket 97-217, Spike Technologies takes issue with Section 21.908(e), stating that the language in 21.908(a) through (d) should instead be followed according to its interpretation of the words contained therein. It then goes on to offer formulas of its own as substitutes for those now included in the Rules. It asserts that there is no consistency between Section 21.908(e) and the other paragraphs of Section 21.908 (and presumably the equivalent paragraphs of Section 74.936). It claims that its methods will result in lower cost equipment, while equipment complying with the current Rules "will not, in fact, result in any additional interference protection."

This document will address the issues raised by Spike. It will begin by laying out the requirements for appropriate application of spectral masks. It will then provide some of the history that led to the language incorporated in the current Rules. It will show the validity of the measurement methods and formulas embodied in the current Rules. Next it will address Spike's approach, showing that the formulas offered are both technically and mathematically incorrect. Moreover, it will show that, even if Spike's formulas were corrected to achieve the results they seek, the result would be an unworkable interference environment for the MDS and ITFS services.

Spectral Mask Requirements

Spectral masks serve several purposes. Primarily, they provide protection to signals in adjacent channels, allowing receivers to be designed with knowledge of the interference and noise they will experience. They also determine the general noise level that will exist in the spectrum in the region outside the adjacent channels but surrounding the signal controlled by the spectral mask. They can further serve to protect signals located very far away in the spectrum, such as at harmonically related frequencies. In this instance, it is the first two concerns that are important.

A spectral mask ideally provides a good balance between interference protection to neighboring channels and the cost of providing that protection. It implies a combination of amplifier linearity to avoid generating too much out-of-band energy and filters to further reduce the out-of-band energy that is produced. When considering the necessary spectral mask, it is essential also to consider the required noise floor that will permit communication using the types of signals that occupy the neighboring spectrum when all of the nearby channels are active. It is also important to assure that the methods developed for determining compliance with the spectral mask yield consistent results.

Background of Current Rules

The spectral mask now embodied in the Rules is an outgrowth of testing done in support of the Digital Declaratory Ruling that initially permitted digital operation by MDS and ITFS licensees on an interim basis. That testing was reported to the FCC in "Report on Wireless Cable Interference Testing, April 27-May 4, 1995,"¹ an attachment to the Petition for Declaratory Ruling² that led to the Digital Declaratory Ruling.³

In the 1995 testing, a proposed spectral mask was used for interference protection that was based on minimal change from the mask then used for NTSC transmission. A sensitivity analysis was done on that proposed mask by both increasing and decreasing the levels of out-of-band energy that were produced. In the report on the 1995 testing, a number of spectrum plots was provided to show the characteristics of the spectral mask that was used. Figures 2 and 3 of the Interference Testing Report are appended hereto in Annex A as examples.⁴

It can be seen in the figures from the Interference Testing Report that the attenuation value at the channel edge was evaluated by taking the difference between the level of the

¹ Hereinafter the "Interference Testing Report."

² Request for Declaratory Ruling on the Use of Digital Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations, July 13, 1995.

³ Declaratory Ruling and Order In The Matter of Request for Declaratory Ruling on the Use of Digital Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations, released July 10, 1996. (FCC 96-304)

⁴ It should be noted that, in the 1995 testing, a full spectral mask was not used. Instead the spectral mask controlled only the side of the signal (upper or lower) that was adjacent to the desired channel under test. This is reflected in the appended figures.

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flat top of the signal and the level of the point on the channel edge to be evaluated. The same method was used to assess the attenuation at any other point in the spectrum, i.e., the difference was taken between the value in the center of the flat top and the value at the point in the spectrum to be analyzed.

Because the intention of the Petition for Declaratory Ruling was to seek changes from the existing Rules that were as small as possible, the wording used to describe the spectral mask proposed for digital operation paralleled as closely as possible the wording of the existing analog Rules. It was important, however, to differentiate the use of peak power in the analog (NTSC) case from the use of average power proposed in the Petition for the digital case. Thus the wording used to describe the spectral mask was attenuation from the "licensed average power level." Implied in this was the use of the same resolution bandwidth to measure both the signal power (at the flat top of the digital signal) and the attenuated power at the point of interest in the spectrum surrounding the signal.

When the FCC adopted the Digital Declaratory Ruling, it used the words, "Acceptable levels of out-of-band emissions shall reference the average transmitter output power." It also specified that "the relative power of out-of-band emissions shall be measured with 100 kHz resolution bandwidth." Discussions with FCC staff at the time of release of the Digital Declaratory Ruling indicated that the 100 kHz value had been drawn from the spectrum plots submitted with the Petition for Declaratory Ruling. The use of this value is evident in the attached figures from that Petition, although it should be noted that other values were used in other plots submitted with that Petition, including, for example, 10 kHz in Figures 12 and 13.

An important relationship to note in the data submitted with the Petition for Declaratory Ruling is that the resolution bandwidth used to measure the power of the digital signal (at the flat top) is the same as the resolution bandwidth used to measure the attenuated points in the spectrum. The value of the resolution bandwidth used could be increased or decreased, and the amplitude results obtained for particular transition points in the signal spectrum would remain constant. The only change would be the apparent position in the spectrum of the different transition points in the signal resulting from the resolution bandwidth itself, which was the reason for using different resolution bandwidths in the first place.

Spectral Mask Measurement under Current Rules

The current Rules state in Section 21.908(e), "In measuring compliance with the out-of-band emissions limitations, the licensee shall employ one of two methods: (1) absolute power measurement of the average signal power with one instrument, with measurement of the spectral attenuation on a separate instrument; or (2) relative measurement of both the average power and the spectral attenuation on a single instrument. The appropriate one of the two following formulas shall be used in each instance:

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“For absolute power measurements:

$$\text{Attenuation in dB (below channel power)} = A + 10 \log \left(\frac{C_{BW}}{R_{BW}} \right)$$

“For relative power measurements:

$$\text{Attenuation in dB (below flat top)} = A + 10 \log \left(\frac{R_{BW1}}{R_{BW2}} \right)$$

“Where

A = Attenuation specified for spectral point (e.g., 35, 38, 60 dB)

C_{BW} = Channel bandwidth (for absolute power measurements)

R_{BW} = Resolution bandwidth (for absolute power measurements)

R_{BW1} = Resolution bandwidth for flat top measurement (relative)

R_{BW2} = Resolution bandwidth for spectral point measurement (relative)”

It should be clear from the opening words of this paragraph that these are the methods to be used regardless of any interpretation a reader may draw from reading the other paragraphs of Section 21.908. It is, in fact, the intention of these words to clarify how the measurements are to be made and to eliminate any potential confusion that may have been caused by the wording in the other paragraphs. This set of formulas was provided to the Commission by the Petitioners in response to earlier comments by Spike that the Petitioners were not properly interpreting the words in the other paragraphs. Spike objected that this perceived misinterpretation would lead to a more stringent interpretation of the spectral mask requirements than Spike felt was appropriate.

It is the intention of the formulas to recognize that the attenuation required at any point in the spectrum is specified using the same resolution bandwidth to measure both the channel power and the power at the attenuated point. At the same time, the formulas permit different resolution bandwidths to be used in practice by providing compensating factors to normalize the relationships.

Taken to the extreme, the formulas allow the use of a power meter, which has a theoretically unlimited bandwidth, to determine the power of the signal, while using a spectrum analyzer, or similar instrument which has a finite and narrow resolution bandwidth, to measure the power at an attenuated point. This is the case covered by the first formula. In this case, the power meter has an implicit resolution bandwidth of the width of the channel. The ratio between the channel width and the resolution bandwidth of the spectrum analyzer, expressed in decibels, is added as a compensating factor to the attenuation required by the spectral mask defined in the Rules.

In the second formula, a single spectrum analyzer is used to measure both the channel power and the power at the attenuated point in the spectrum. In this case, the ratio between the resolution bandwidth used to measure the channel power (as shown at the flat top of the signal) and the resolution bandwidth used to measure the attenuated point is

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expressed in decibels and is added as a compensating factor to the attenuation required by the spectral mask defined in the Rules. If the same resolution bandwidth is used at both points, the ratio is unity, the decibel value is zero, and no compensating value is required.

These relationships could have been expressed in other ways. In the Sixth Report and Order in the FCC's Digital Television (DTV) proceeding,⁵ the Commission corrected a required attenuation value at the channel edge from 35 dB to 46 dB "to correctly reference the total average power within a 6 MHz channel" when the required resolution bandwidth of 500 kHz was used for the measurement. The difference of 11 dB (10.79 dB when expressed to two decimal place precision) is the ratio between the channel width of 6 MHz and the resolution bandwidth of 500 kHz. The Commission previously had similarly corrected the 60 dB attenuation value required beyond the adjacent channel by requiring an attenuation of 71 dB when measuring with the required 500 kHz resolution bandwidth.⁶

Such fixed compensations for resolution bandwidth can work for the broadcast Rules because the channel bandwidths are fixed. The Commission does, however, allow use of other resolution bandwidths "as long as the appropriate correction factors are applied."⁷ For the MDS and ITFS spectrum, in which both sub-channelization and super-channelization are contemplated, it was felt that a better approach was to provide the compensation formulas directly in the Rules. They permit the licensee the flexibility to choose an appropriate resolution bandwidth for the specific situation while still achieving the necessary compensation for that choice. That is why the Petitioners proposed the formulas to the FCC and, presumably, why the Commission adopted them. It should be noted that if the formulas included in Section 21.908(e) were appropriately applied to the broadcast case, exactly the same results as embodied by the Sixth Report and Order would obtain.

Spike's Formulas

Spike Technologies, Inc., in its Petition for Reconsideration, proposes to change the formulas in Section 21.908(e) to read as follows:

"For absolute power measurements:

$$\text{Attenuation in dB (below channel power)} = A_{FT} + 10 \log \left(\frac{C_{BW}}{R_{BW}} \right)$$

"For relative power measurements:

$$\text{Attenuation in dB (below flat top)} = A_{FT} + 10 \log \left(\frac{R_{BW1}}{R_{BW2}} \right)$$

⁵ Sixth Report and Order In the Matter of Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service, released April 27, 1997, at paragraph 194. (FCC 97-115)

⁶ The emissions mask requirements for broadcast DTV were subsequently changed to different values, but the relationships remain the same between the actual attenuation requirements and the values required to be measured in a 500 kHz resolution bandwidth (i.e., 99 dB and 110 dB after compensation).

⁷ Memorandum Opinion And Order On Reconsideration Of The Sixth Report And Order, Released: February 23, 1998, at paragraph 93. (FCC 98-24)

“Where:⁸

Attenuation in dB (below channel power)

= Attenuation specified for spectral point (e.g., 35, 38, 60 dB)

A_{FT} = Attenuation in dB (below flat top)

Attenuation in dB (below flat top)

= Attenuation in dB (below channel power) – 10log (C_{BW}/R_{BW})

C_{BW} = Channel bandwidth (for absolute power measurements)

R_{BW} = Resolution bandwidth (for absolute power measurements)

R_{BW1} = Resolution bandwidth for flat top measurement (relative)

R_{BW2} = Resolution bandwidth for spectral point measurement (relative)”

When these formulas are examined closely, it becomes apparent that they cannot work as intended. In the case of the first proposed replacement formula – the one for absolute power measurements – the Attenuation in dB (below channel power) has been redefined to be the Attenuation specified for the spectral point; there is a reference to the Attenuation in dB (below flat top); and there is a compensation factor between the channel bandwidth and the resolution bandwidth. There is no longer any value included in the formula for the absolute power measurement itself. With no place to put the value obtained from a power meter, this formula no longer serves its intended purpose.

In the case of the second proposed replacement formula – the one for relative power measurements – the equality is between Attenuation in dB (below flat top) and A_{FT} plus a resolution bandwidth compensation factor. Since A_{FT} is defined as equaling Attenuation in dB (below flat top), the only way an equality can exist is for the two resolution bandwidths to be the same, resulting in a compensation factor of zero, and then Attenuation in dB (below flat top) equals itself. The formula consequently serves no purpose.

If one considers the formula that now appears in the Where section, in which Attenuation in dB (below flat top) equals Attenuation in dB (below channel power) minus a compensation factor, its purpose seems to be to reverse the fact that the flat top appears below the full channel power level when viewed on a spectrum analyzer. This relationship, of course, results because the resolution bandwidth normally used is less than the full channel bandwidth.

Consider next a realistic set of numbers for this formula. Let the channel bandwidth be 6 MHz, the resolution bandwidth be 10 kHz, and the value for Attenuation in dB (below flat top) be calculated at the channel edges, where Attenuation in dB (below channel power) would become 25 dB. The result is that Attenuation in dB (below flat top) at the channel edges would be –2.78 dB (25 – 27.78). This means that the value could be

⁸ Emphases from original Spike Technologies, Inc., document.

above the flat top at the channel edges by nearly 3 dB – clearly not the desired result, and probably a physical impossibility.

Interference Environment

In several of its filings with the Commission, Spike has indicated that it wants to shift the spectral mask 18 dB from the values that result from the Petitioners' interpretation of the spectral mask. This value derives from the difference between the full 6 MHz channel power and that captured by a spectrum analyzer with resolution bandwidth of 100 kHz. Let us assume for a moment that Spike had developed formulas that yielded this result. Then let us examine what happens to the interference environment under such conditions.

Under the current Rules, if one measures the power from a transmitter in a non-adjacent channel of the same bandwidth, the maximum power allowable will be 60 dB below that in the transmitter's channel of operation. If we assume 6 MHz channels for this exercise, there will be 31 of them in the 2.5-2.686 GHz MDS and ITFS band. Let us further assume that there are 31 transmitters, covering the entire band, collocated at a single site, all of them operating at the same power level. Each of them produces energy exactly 60 dB below that in its channel of operation in all channels beyond the adjacent channels. The adjacent channels follow the slopes given in the spectral mask.

When one determines the noise floor in all the channels in the band, it turns out that the noise power in each channel will be slightly less than 45 dB below the operating power level of the transmitters. This derives from the 60 dB value for a single transmitter minus a factor of 15 dB (14.77 dB to two decimal places) for the number of transmitters involved. Further reducing the difference between the transmitted signal and the transmitted noise is the fact that the adjacent channels will have even more energy that must be totaled with the power from non-adjacent channels. The result is that any analog NTSC stations that happen to be among the 31 transmitters will encounter a noise floor just low enough so as to permit a video signal-to-noise ratio on the order of 45 dB.⁹ This is just good enough to permit reasonably high quality video performance at the receiver. It is important to note that it does not matter what received signal level is achieved at any given receiver, the video signal-to-noise ratio can be no better than the 45 dB value.

Spike's proposal is to reduce the required attenuation below average digital channel power by 18 dB. Considering again the situation described in the preceding paragraph, the noise transmitted in non-adjacent channels will be 42 dB (60-18) below the output of a single transmitter. The accumulated power from all transmitters will be just 27 dB (42-15) below the output of a single transmitter. Thus the received video signal-to-noise ratio will be no greater than 27 dB, no matter how high the received signal level. Thus by Spike's approach, the maximum achievable signal performance will drop from CCIR-4.8 to CCIR-2.2 on the five-point impairment scale. With respect to Spike's assertion that equipment complying with the current Rules "will not, in fact, result in any additional

⁹ After the various bandwidth, noise weighting, and similar correction factors are applied, NTSC video signal -to-noise ratio is approximate equal to the RF carrier-to-noise ratio (within about a decibel).

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interference protection” beyond that proposed in its method, this paragraph shows that not to be the case.

The Petitioners in the Two-Way Petition for Rulemaking that led to the current Rules, who include the group of Petitioners that filed the Petition for Declaratory Ruling, submitted data supporting their proposed spectral mask together with the Petition for Declaratory Ruling. The data was sufficient to convince the Commission that digital operations of MDS and ITFS transmitters could be based on the then-proposed spectral mask, now included in the Rules (with some minor modifications supported by the original data submitted). Spike has submitted no such supporting test data to show that its approach to the spectral mask will, in fact, provide adequate interference protection. Until it does so, the analysis above indicates that its method cannot work.

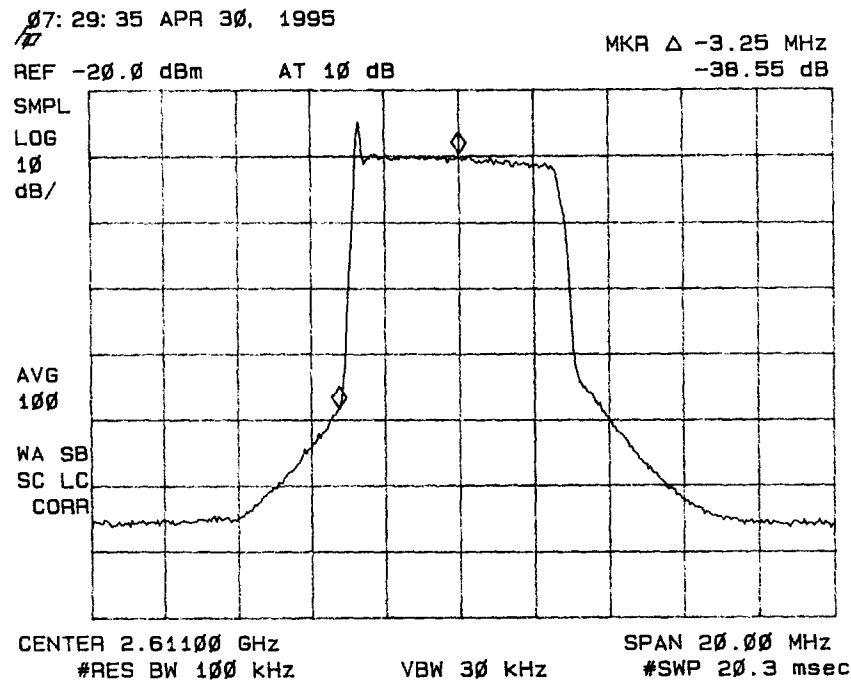


Figure 2 – Mask 1 (-38 dB Intermod Intercept) Lower Adjacent Channel Response of Channel E2 w/8-VSB Modulation (Ultimate rejection limited by spectrum analyzer noise floor – 60 dB ultimate rejection confirmed separately)

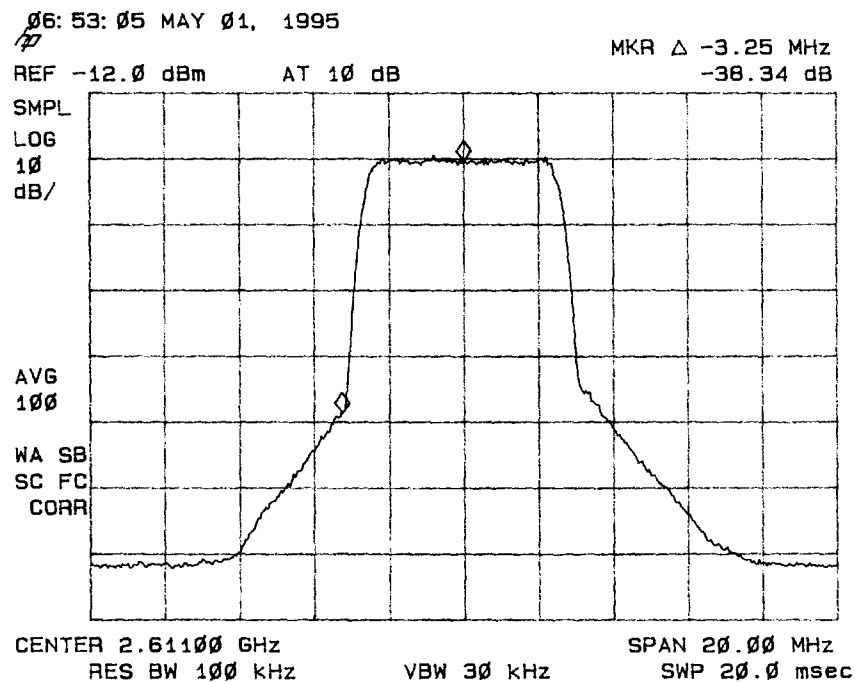



Figure 3 – Mask 1 (-38 dB Intermod Intercept) Lower Adjacent Channel Response of Channel E2 w/64-QAM Modulation

CERTIFICATE OF SERVICE

I, Deanna L. Susens, hereby certify that the foregoing Petition for Reconsideration was served this 4th day of February, 1999, by depositing a true copy thereof with the United States Postal Service, first-class postage prepaid, addressed to the parties listed on the attached list unless otherwise noted:


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